

**SUPERFUND PROPOSED PLAN
LUSHER STREET GROUNDWATER CONTAMINATION SUPERFUND SITE
ELKHART COUNTY, INDIANA
REGION 5
APRIL 2014**

Community Participation

EPA and the Indiana Department of Environmental Management (IDEM) provide information regarding the Lusher Street Groundwater Contamination Superfund Site through public meetings, the Administrative Record for the Site, and announcements published in the *Elkhart Truth*. EPA and IDEM encourage the public to gain a more comprehensive understanding of the Site and the Superfund activities that have been conducted at the Site. Additional information can also be found at EPA Region 5's web site located at www.epa.gov/region5.

The Administrative Record, which contains the information used to develop the site remedy, is at the following location:

Elkhart Public Library
Reference Services
300 S. Second Street
Elkhart, Indiana

[also in the Region 5 record center]

The public comment period will run for a total of thirty days and be from April 21, 2014 to May 22, 2014 and the EPA will be accepting written comments on the Proposed Plan during the public comment period. Written comments can be sent to the following address: Cheryl Allen, Community Involvement Coordinator, United States Environmental Protection Agency, 77 W. Jackson Blvd. (Mail Code SI-7J), Chicago, IL 60604. For other questions, contact Syed Quadri, Remedial Project Manager, at quadri.syed@epa.gov.

A **public meeting** will be held to discuss all the alternatives and the preferred remedy. Written and oral comments will be accepted at the meeting. The meeting will be held at the following location:

**April 29, 2014
6:30 PM to 8:00 PM
Calvary United Methodist Church
2222 W. Indiana, Elkhart, IN**

EPA Announces Proposed Plan

This proposed plan identifies EPA's preferred alternative for addressing risks associated with contaminated groundwater at the Lusher Street Groundwater Contamination Site ("Site" or "Lusher Site") and provides a rationale for this preference. In addition, this plan includes summaries of other alternatives evaluated for use at the Site. This plan is being issued by EPA, the lead agency for activities at the Lusher Site, and the Indiana Department of Environmental Management (IDEM), the support agency. Following issuance of this plan, after reviewing and considering all information received during the 30-day public comment period, EPA, in consultation with IDEM, will select an interim remedy for the Site. EPA may modify the preferred alternative or select another response action presented in this plan based on new information or on public comments. Therefore, the public is encouraged to review and comment on all of the alternatives presented in this proposed plan. EPA's final decision on this interim remedy will be presented in a document called a Record of Decision (ROD).

EPA is issuing this proposed plan in accordance with Section 117 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended, which requires the issuance of decision documents for remedial actions taken pursuant to Sections 104, 106, 120, and 122 of CERCLA. This proposed plan is also part of EPA's public participation responsibilities under Section 300.430(f)(2) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This plan summarizes information that can be found in greater detail in the final Remedial Investigation (RI) report and final Focused Feasibility Study (FFS) report, as

well as other supporting documents contained in the Administrative Record file for this Site. EPA and IDEM encourage the public to review these documents to better understand the Lusher Site and the extensive investigation and cleanup-related activities conducted to date.

While EPA continues to study long-term clean up options at the Lusher Site, this Plan presents interim remedial alternatives and identifies a preferred interim alternative to eliminate actual or potential human health exposures from drinking or otherwise using contaminated groundwater and from inhaling vapors emanating from contaminated groundwater underlying the Site. The latter exposure is described as “vapor intrusion” (VI) to reflect actual or potential impacts from vapors that are or could be entering occupied structures such as homes. A final cleanup plan (remedy) cannot be selected at this time because all the sources of contamination associated with this Site have not yet been fully identified and investigated. The findings of follow-on investigations will be used to determine the scope of the final remedy, as well to determine the extent to which the final remedy will affect cleanup described in this proposed plan.

As explained further in this proposed plan, interim remedial alternatives discussed are intended only to eliminate current exposure to contaminated groundwater and intruding vapors.

Please review the fact sheet "What You Should Know About the Problem of Vapor Intrusion" at the following link: <http://www.epa.gov/region5/cleanup/conrail/pdfs/vaporintrusion-fs-201201.pdf>
You may also refer to the following EPA web site for further detailed information on vapor intrusion:
<http://www.epa.gov/oswer/vaporintrusion/>

The preferred remedial alternatives presented in this proposed plan are interim measures effective in eliminating human health exposure to contaminated groundwater and intruding vapors. EPA plans to address the cleanup of the source areas and the overall groundwater plume(s) at the Lusher Site at a later time through a separate response (cleanup) action.

I. SITE HISTORY

The Lusher Site is located in Elkhart, Indiana and occupies about 870 acres. The boundaries for the Lusher site are the St. Joseph River on the north; State Road 19 (Nappanee Street) on the west; Hively Avenue to the south and Oakland Avenue to the east (see Figure 2). The estimated population living within the Site boundaries is approximately 2,600. The Site is composed of mixed residential, commercial, and industrial areas bisected by a railroad and served by a mix of private wells and public water supply wells.

The Lusher Site was first identified as a result of investigations conducted at the K.G. Gemeinhardt Company, Incorporated (Gemeinhardt) manufacturing facility located to the southwest of the Lusher Site at 57882 State Route 19. Groundwater contamination was discovered that did not appear to be associated with Gemeinhardt operations. EPA initially assumed that most of the contamination was from businesses on Lusher Avenue, and so named the new site the Lusher Street Groundwater Contamination Site (misidentifying the name of the road). Although the Site is called the “Lusher Street Groundwater Contamination Site,” Lusher Street is actually Lusher Avenue.

The Lusher Site generally encompasses the area of a groundwater plume contaminated with volatile organic compounds (VOCs). The source or sources contributing to the Lusher Street

groundwater plume contributing to actual or potential VI have not been fully identified. In 2009, EPA conducted a preliminary investigation for the Lusher Site and identified nine potential source areas, which are discussed in detail in the final RI report. EPA is continuing to actively evaluate these and other potential sources.

The Lusher Site groundwater plume primarily contains chlorinated VOCs, including tetrachloroethene (PCE); trichloroethene (TCE); chloroform; 1,1-dichloroethane (DCA); and vinyl chloride. Historically, 1,1,1-trichloroethane (1,1,1-TCA); 1,1-dichloroethene (DCE); and 1,2-DCE have also been detected in groundwater at this Site. Chlorinated VOCs were commonly used as industrial solvents.

Currently, properties at the Lusher Site obtain drinking water supply from both public and private groundwater wells. Although the depths of the private wells are unknown, they are suspected to be shallow and are located in the sand and gravel St. Joseph Aquifer beneath the Site. The RI identified 94 private wells within the boundaries of the Lusher Site.

II. CLEAN-UP AND INVESTIGATIVE ACTIVITIES TO DATE

A number of initial clean-up actions have been taken at the Site. Refer to Figure 1 for a summary of activities leading up to the final National Priorities List (NPL) listing. Groundwater contamination resulting in NPL designation of the Lusher Site was discovered during an investigation performed at the Gemeinhardt facility. In 1985, Gemeinhardt signed a consent decree and agreed to an interim remedial action to fully characterize contamination sources and to conduct a study of the extent of groundwater contamination to the north-northwest of their facility. This study identified VOCs in private drinking water wells in an area south of Lusher Avenue. In 1987, the Elkhart County Health Department (ECHD) began their own groundwater investigation and collected samples from 145 private drinking water wells, of which 103 of these wells were found to contain elevated levels of TCE up to 128 micrograms per liter ($\mu\text{g/L}$) or parts per billion and 1,1,1-TCA up to 500 $\mu\text{g/L}$. The federal maximum contaminant level (MCL) for public water supply systems established under the Safe Drinking Water Act (SDWA) is 5 $\mu\text{g/L}$ for TCE and 200 $\mu\text{g/L}$ for 1,1,1-TCA. Although the SDWA does not apply to private wells, MCLs are frequently used for comparison purposes where groundwater either is (or potentially could be) used as a drinking water source. Subsequently, ECHD requested assistance from EPA in providing alternate drinking water to the affected residences and businesses.

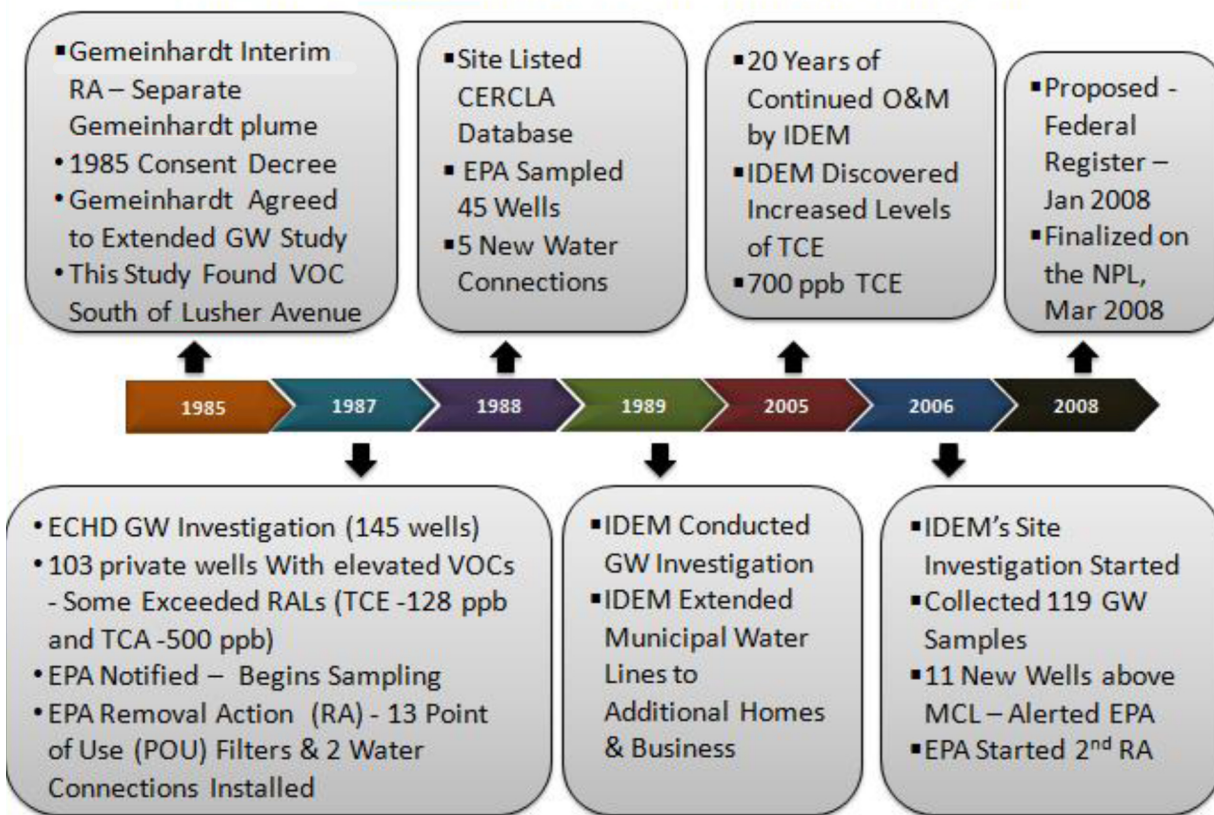
In October 1987, EPA began a groundwater investigation, which confirmed the presence of TCE and 1,1,1-TCA in drinking water wells at concentrations exceeding levels that require taking immediate action. The highest concentration of TCE and 1,1,1-TCA detected was 800 $\mu\text{g/L}$ and 1,590 $\mu\text{g/L}$ respectively. As a result, EPA initiated a removal action at the Site to address immediate threats to human health from groundwater contamination. EPA's removal program installed 13 point-of-use (POU) carbon filtration systems and connected two buildings to the municipal water supply.

EPA also conducted an extent of contamination study from January-March 1988, which included collecting samples from a total of 45 private wells. Based on this study, five additional residences and businesses were connected to the municipal water supply. In the summer of 1989, IDEM conducted water testing to determine if additional homes would need alternate water

supplies. This effort resulted in IDEM extending the municipal water supply to the majority of properties impacted. IDEM has been conducting operation and maintenance (O&M) activities at the Lusher Street homes serviced by EPA and IDEM. In 2005, IDEM detected TCE at a concentration of over 700 µg/L at one residence. Subsequent groundwater sampling conducted by IDEM in 2006 revealed that numerous nearby private wells had also been impacted with elevated levels of VOCs. The results showed concentrations of TCE between 7.4 µg/L to 640 µg/L in 11 wells. In 2006, IDEM provided bottled water to residents whose private well water exceeded MCLs and subsequently notified EPA. EPA's Emergency Response then provided these residents with POU carbon filtration systems.

The Lusher Site was proposed to be added to the NPL on September 19, 2007 and made final on the NPL on March 19, 2008.

Figure 1- Lusher Site's Pre-NPL Timeline Analysis



III. COMMUNITY INVOLVEMENT ACTIVITIES TO DATE

In 2009 EPA developed a Community Involvement Plan (CIP) for the Lusher Site. The CIP is a document that EPA uses to address community concerns and expectations, as determined from community interviews. The CIP also contains a list of current federal, State, and local officials; information repositories, interested groups, and media contacts.

EPA actively informed the public of activities at the Lusher Site. EPA, working with the Agency for Toxic Substances and Disease Register (ATSDR), held “open houses” on November 5 and 6, 2008, in the area of the Site. EPA shared information about the RI and the planned soil and groundwater testing. ATSDR talked to residents about health concerns. EPA again held “open houses” on October 16, 2012, during which EPA and IDEM shared sampling results, answered questions about the Site, and discussed future plans. EPA shared fact sheets with area residents and businesses, and maintains current information on the web site at www.epa.gov/region5/cleanup/lusher. Each time a new document is added to the Administrative Record, an updated CD is sent to the information repository at the Elkhart Public Library.

IV. SITE CHARACTERISTICS

The Lusher Site is relatively flat, with little elevation change except near the St. Joseph River, the Site’s northern boundary. At the river’s edge, the surface elevation steeply drops approximately 20 feet to the water level. The average elevation throughout the Site is approximately 750 feet above mean sea level. The principal source of groundwater in Elkhart County is the unconsolidated outwash sand and gravel deposits known as the St. Joseph Aquifer. The City of Elkhart obtains water from this aquifer. Based on the groundwater monitoring wells installed during the RI, the depth to groundwater is approximately 20 feet below ground surface (bgs) at the southern Site boundary (Hively Street) and decreases northward as groundwater discharges to the St. Joseph River at the northern Site boundary. Flow through the aquifer generally is horizontal toward the St. Joseph River.

Soil Investigation

EPA conducted a preliminary investigation at various properties within the Lusher Site during two phases of field work from April to May 2009 and in October 2009. The RI initially focused on sources that could be contributing to chlorinated VOCs in groundwater. The soil investigation included advancing 76 borings at 14 properties.

Groundwater Investigation

The groundwater investigation included collecting 73 groundwater samples from 76 temporary monitoring wells and 11 groundwater samples from existing monitoring wells. Soil borings were advanced to 5 feet below the groundwater table or to approximately 20 feet bgs. One soil sample was collected from each 4- to 5-foot interval at each boring location and analyzed for VOCs. Groundwater samples were collected at each soil boring where saturated conditions were encountered. Chlorinated VOCs were detected in soil or groundwater at 10 of the 14 properties investigated.

All groundwater samples were analyzed for VOCs. A subset of the groundwater samples from private wells also was analyzed for metals, polychlorinated biphenyls (PCBs), pesticides, and semi-volatile organic compounds (SVOCs) to determine if these contaminants are present at the

Lusher Site. No metals, PCBs, pesticides, or SVOCs were identified as contaminants of potential concern (COPCs). Nine VOCs (1,1,1-TCA, 1,1-DCA, benzene, chloroform, cis-1,2-DCE, methylene chloride, PCE, TCE, and vinyl chloride) were identified as COPCs in groundwater based on comparison to risk-based screening levels.

Additional Groundwater and Vapor Intrusion Investigation

EPA performed additional field work during several events between from 2010 through 2012. These activities evaluated the extent of the groundwater plume and the potential for vapor intrusion. As part of the additional groundwater investigation, EPA collected groundwater samples from 54 private wells; 135 groundwater samples for vertical aquifer sampling from 20 locations; and 93 groundwater samples from 31 monitoring wells installed at 15 locations. As part of the VI evaluation, groundwater samples from the water table were collected from 53 locations; soil vapor samples were collected from 28 locations within the right-of-ways of streets; sub-slab samples were collected from 27 residences; and indoor air samples were collected from 18 residences. Six VOCs were identified as vapor intrusion COPCs: 1,1,1-TCA, chloroform, PCE, TCE, vinyl chloride, and benzene. The RI concluded that only two VOCs identified as COPCs, TCE and PCE, had a complete vapor intrusion pathway. There are some uncertainties about the exact number of properties subject to vapor intrusion. The Risk Assessment, which uses a different methodology than the RI, evaluated indoor air sample results and identified TCE, PCE, benzene, toluene, as COPCs. The VI pathway was confirmed to be complete in 72-75 percent of the residences from which paired sub-slab and indoor air samples were collected. For the residences where the VI pathway is complete, none of the concentrations exceeded the removal action levels used by Region 5 that would require immediate action.

The distribution of VOCs suggests several sources of contamination, which are likely located in or near the southern two-thirds of the plume area. The Gemeinhardt plume is located southwest to the Lusher Site Plume and does not appear to be connected as shown in Figure 3. Because of the high permeability of the sand and gravel aquifer, groundwater contamination is expected to move rapidly. The area where VOC concentrations in groundwater exceed MCLs and where VI represents a potential threat primarily is located in the central and north-central portions of the Site (refer to Figure 3).

V. SCOPE AND ROLE OF THIS ACTION

The interim action proposed in this plan will be the first remedial action taken at the Site. The Lusher Site is divided into two Operable Units (OU): OU 1 – Contaminated Private Wells and VI; and OU 2 – Source Control and Site-Wide Groundwater. This proposed plan focuses on OU 1. OU 2 will be addressed as part of a separate RI/FS. The scope of this proposed plan is to implement an interim remedial action to address the human health exposures caused by the current potential exposures to groundwater contamination and vapor intrusion. Potential long-term groundwater and source areas cleanup alternatives will be evaluated in a separate decision document.

During the RI only 2 of the 54 existing residential wells sampled contained TCE at concentrations exceeding the MCLs. However, higher levels of contamination have been found elsewhere in the groundwater, resulting in previous removal actions to install filters and connect homes to the municipal water supply at multiple locations at the Site. The Interim Groundwater

remedial area includes all properties currently occupied and not connected to a municipal water supply, located within the plume area with an approximate 500 foot buffer from Lusher Site plumes or potentially downgradient of the plume (Please refer to Figure 3). Groundwater contamination within the Gemeinhardt plume is not part of the Lusher Site, and therefore not part of the interim remedial action. The small plume just east of the Gemeinhardt plume is part of the Lusher Site plume. The buffer zone is being used to accommodate some of the uncertainties associated with the Lusher Street plume delineation. The uncertainties of the plume delineation derive from dispersivity¹ calculations and the transient nature of the potentiometric surface of the groundwater resulting from the seasonal climate and weather patterns. In addition, there are other influences on the contaminant distributions and plume delineation such as diffusion, advection-dispersion, adsorption and absorption. Additionally groundwater will follow sinuous flow paths in heterogeneric aquifers due to differences in hydraulic conductivity. This area has a mixture of sands and gravels with intermittent silts and clays and that affects groundwater/contaminant flow directions in and downgradient of the plume.

Two portions of the Site have been excluded from the interim groundwater remedial action. The first of these, the northeast portion of the Site, is shown on Figure 3. Contamination has not been detected on this portion of the Site and it is located cross- or up-gradient from the plume. The second area is located in the southeast portion of the Site, upgradient of the plume. Figure 3 shows properties without a water account and the areas where municipal water is not currently available. It is estimated that 72 properties (see Figure 3) with buildings are not currently connected to municipal water. The number of properties with buildings requiring connection to municipal water is based on (1) geographic information system data obtained from Elkhart County and (2) a list of addresses with water accounts obtained from the City of Elkhart Public Works Department. The actual number may vary as buildings are condemned, demolished, abandoned, or constructed; and will be verified during the remedial design and construction phases.

During the RI, the VI exposure pathway (groundwater contaminated with VOCs that may volatilize and travel through soil and migrate into buildings) was investigated and determined to be a complete pathway. A vapor intrusion area of concern was identified and is illustrated in Figure 3. This area is roughly centered on the intersection of West Indiana Avenue and West Franklin Street. Available data indicate that approximately 196 buildings are present in this area. The Vapor Intrusion area of concern was delineated using a multi-step approach based on data evaluation of shallow groundwater, soil vapor, sub-slab and indoor air sample results; this area represents a portion of the Site where most of the Site-related risks and hazards are expected to occur. Based on the data collected, buildings outside the Vapor Intrusion area of concern are not exposed to Site-related risk and hazards. EPA evaluated the projected costs of sampling and re-sampling all of the estimated 196 buildings in the vapor intrusion area of concern for a 10-year period, followed by evaluation and mitigation of 45% or 65% of the buildings. EPA concluded that it would be more cost-effective to pre-emptively mitigate all of the buildings, rather than sample, mitigate just those that require mitigation, and continue to resample others indefinitely. Therefore, the alternatives to address vapor intrusion are assumed to apply to all buildings within the vapor intrusion area of concern.

¹ Dispersivity is the flow of groundwater in an inhomogeneous porous media.

VI. SUMMARY OF SITE RISKS

The Human Health Risk Assessments (HHRAs) were prepared using EPA's Risk Assessment Guidance for Superfund and evaluate potential current and future exposure scenarios at the Site.

To estimate the risk to human health at a Superfund site (i.e. the likelihood of health problems occurring if no cleanup action is taken at a site) EPA guidance outlines a four-step process:

Step 1: Analyze Contamination

Step 2: Estimate Exposure

Step 3: Assess Potential Health Dangers

Step 4: Characterize Site Risk

The risk assessment will be a central part of the final remedial actions at the Site. This interim action is focused solely on the potential current exposures.

Groundwater

The primary risk driver in groundwater is provided in the table below.

Summary of Groundwater – Risk Drivers (COCs) Only

Analyte	Maximum Concentration	MCL or RSL
Trichloroethene	370 µg/l	5 µg/l

Note:

- a. All concentrations are in micrograms per liter (µg/l)

The levels of TCE detected in the groundwater exceed the federal and state MCLs (see table) in samples from private wells. Exceedances above the MCL generally trigger CERCLA action and need to be addressed by a remedy under CERCLA. Federal and state MCLs are considered as Applicable or Relevant and Appropriate Requirements (ARARs) under EPA's decision making criteria described in Section VII below. This interim action addresses the current exposure to groundwater contaminated with TCE above Federal and State MCLs.

TCE was the contaminant most frequently found above MCLs in non-private well groundwater samples collected during the RI. Several other VOCs (1,1-dichloroethane, 1,1-dichloroethene, benzene, cis-1,2-dichloroethene, methylene chloride, and vinyl chloride) were also detected at concentrations exceeding the MCLs in groundwater samples (other than the private wells) collected during the RI.

Vapor Intrusion

Primary risk drivers for Vapor Intrusion are provided in the table below.

Summary for Vapor Intrusion – Risk Drivers (COCs) only

Analyte	Max concentration ($\mu\text{g}/\text{m}^3$)	Screening level used in Risk Assessment ($\mu\text{g}/\text{m}^3$)	Screening level – per Region 5 Vapor Intrusion Guidance (10^{-5} cancer risk, $\text{HI}=1$) ($\mu\text{g}/\text{m}^3$)
Trichloroethene	12	0.43	2.1
Tetrachloroethene	48	9.4	42
Chloroform	14	0.11	1.1
1,1-Dichloroethane	2.8	1.5	15

Notes:

- All results and screening levels are for indoor air at residential properties.
- The screening level used in the risk assessment was the lowest of the Vapor Intrusion Screening Level (VISL) Calculator (May 2012 RSLs) and State Guidance.
- The screening level per Region 5 Vapor Intrusion Guidance is calculated using the same VISL Calculator using May 2012 RSLs.
- The RI Report identified a complete vapor intrusion pathway for three analytes, as indicated. The risk assessment does not distinguish between complete and incomplete pathways.

The RI evaluated Vapor Intrusion Risks in accordance with the EPA Region 5 Vapor Intrusion Guidance Manual. This evaluation was performed at the 29 properties from which sub-slab or crawl space, and indoor air samples were collected during three sampling events. These three contaminants were shown to present a vapor intrusion risk as indicated through the lines of evidence from the data collected. When compared to the Region 5 Vapor Intrusion Guidance, 13 of the 29 properties (about 45%) had VI concentrations that indicated mitigation was appropriate; 11 of the 29 properties (about 38%) had VI concentrations that indicated resampling was appropriate; and the remaining 5 properties (about 17%) had VI concentrations that indicated no further action was appropriate.

Having established a need for action, the next step is to identify where to take the action. Currently part of the Site risk is due to the ingestion or inhalation (such as vapors when bathing or cooking) of contaminated groundwater; the other major Site risk is from vapor intrusion. To address the use of ingestion and inhalation of contaminated groundwater, EPA evaluated two cleanup options for alternate water supply (see below). The evaluated vapor intrusion alternatives assume that all properties with buildings within the designated areas of the Site (see Figure 3) will be provided with vapor mitigation systems.

At the Lusher Site, none of the properties sampled presented a vapor intrusion risk that indicated that an emergency action is necessary. The vapor intrusion sampling indicates that 45% of the properties will require mitigation and 38% of the properties will require re-sampling to determine if the risk from VI has increased such that mitigation will be needed in the future. EPA evaluated the projected costs of re-sampling and re-evaluation 38% of the estimated 196 buildings in the Vapor Intrusion area of concern. EPA concluded that it would be more cost-effective to pre-emptively mitigate all of the buildings, rather mitigate just those that currently indicate mitigation is appropriate and resample others periodically for an indefinite amount of time. Therefore, the alternatives to address vapor intrusion are assumed to apply to all buildings within the vapor intrusion area of concern.

VII. REMEDIAL ACTION OBJECTIVES (RAOs)

RAOs are goals specific to media or OUs for protecting human health and the environment. They are based on unacceptable risks, anticipated current and future land use, objectives of the action and expectations and statutory requirements.

RAOs for the planned interim action RAOs for OU 1 are as follows:

RAO 1: Prevent human exposure to COCs in groundwater through ingestion, dermal contact, and inhalation above levels that are protective of beneficial use (i.e., drinking water use).

RAO 2: Prevent human exposure to COCs in soil vapor associated with soil and groundwater contamination above protective levels.

The proposed remedial action levels are provided in the tables below:

Groundwater Remedial Action Levels

COC	Remedial Action Level
Trichloroethene	5 µg/l

Note:

- a. The groundwater remedial action levels are based on the MCLs.

Vapor Intrusion Remedial Action Levels

COC	Residential Remedial Action Level (µg/m ³)	Commercial / Industrial Remedial Action Level (µg/m ³)	Max concentration (µg/m ³)
Trichloroethene	2.1	8.8	12
Tetrachloroethene	42	180	48
Chloroform	1.1	5.3	14
1,1-Dichloroethane	15	77	2.8

Notes:

- a. Vapor Intrusion Remedial Action Levels are based on the Region 5 Vapor Intrusion Guidebook. They are set at the 1×10^{-5} additional cancer risk, and a non-cancer Hazard Index of 1.
- b. Indoor air goals are applicable only to those chemicals for which a complete vapor intrusion pathway exists, as CERCLA cannot address contamination which is not Site related. The RI Report identified complete vapor intrusion pathways for four chemicals identified as risk drivers / COCs: Trichloroethene, tetrachloroethene, chloroform, and 1,1-dichloroethane.

The interim remedial actions are intended to address current threats in the short term and will not perform any groundwater remediation to return it to its beneficial use. The final Site remedy will be selected in a subsequent decision document after source areas are fully characterized and addressed. The other areas of the Site where the RI identified groundwater samples with concentrations exceeding the MCLs are located on source areas, and will be addressed during the final remedies for the Site.

VIII. DESCRIPTION OF ALTERNATIVES

Several removal actions have already been implemented to address multiple Site locations where elevated levels of TCE have been identified. These actions include the installation and maintenance of point-of-use water filters and the connection of municipal water. EPA has developed and evaluated several cleanup alternatives to address the remaining current risk of human exposure to groundwater contamination and vapor intrusion.

A. INTERIM GROUNDWATER ALTERNATIVES

The groundwater alternatives are intended to meet RAO 1. The main ARARs for the interim groundwater alternatives are the Safe Drinking Water Act and the Indiana Drinking Water Standards. A complete list of the ARARs considered is included in the FFS report.

Alternative GW-1: No Action

Estimated Capital Cost: \$0

Estimated Total O&M: \$0

Estimated Present-worth Cost: \$0

Estimated Construction Timeframe: None

Under this alternative, no action would be taken to mitigate risk associated with contaminated groundwater. Inclusion and evaluation of this alternative is required under the NCP.

Alternative GW-2: Filtration Systems and Institutional Controls

Estimated Capital Cost: \$500,000

Estimated Total Present-Worth O&M: \$1,200,000

Estimated Total Cost: \$ 1,700,000

Estimated Construction Timeframe: < 1 year

Alternative GW-2 would involve the installation of activated carbon in-line filters at properties located within the proposed interim groundwater remedial area that are currently occupied and not connected to a municipal water supply. The carbon filters would remove the contaminants and decrease the risks from ingesting and/or inhaling contamination in groundwater. Based on property-specific circumstances, either whole-house or point-of-use filters would be installed. The decision regarding which type of filter would be made during the remedial design phase. Long-term operation and maintenance of the filter systems would be required.

An estimated 72 properties would receive filtration systems under this alternative. The filter systems would require regular and ongoing maintenance, so that the remedy would require agreements to assure continued access to the residents' homes. In addition, institutional controls (ICs) such as deed restrictions and/or a local ordinance would be required to prevent potable use of untreated groundwater. Newly constructed buildings would be required to connect to municipal water (if available) or have filters installed and maintained. The ICs also would require the notification to construction and utility workers of the presence of potentially contaminated groundwater so that they could take appropriate precautions. Because contamination would be left in place, this alternative would require 5-year reviews. This alternative would remain in place until the source(s) are controlled and groundwater cleanup

goals have been achieved. At this time, it is not known how long the filters would have to remain in place, but it would likely be at least 20 years.

Alternative GW-3: Alternate Water Supply

Estimated Capital Cost: \$1,800,000

Estimated Total Present-Worth O&M: \$120,000

Estimated Total Cost: \$ 2,000,000

Estimated Construction Timeframe: < 1 year

Alternative GW-3 would include connecting to municipal water all currently occupied properties within the proposed interim groundwater remedial area not already connected to the City of Elkhart municipal water supply. Properly installed water supplies have long life spans and are expected to last for decades, with essentially no maintenance. An estimated 72 properties will be connected to the City of Elkhart municipal water supply. This would involve the extension of water mains and service connections where needed. Following completion of the connections, existing potable water wells would be abandoned in accordance with state and local requirements to prevent future use. ICs similar to those discussed above under Alternative GW-2 would be required and would remain in place until the contamination source(s) are controlled and groundwater cleanup goals are achieved. Because contamination would be left in place, this alternative would require 5-year reviews.

B. VAPOR INTRUSION ALTERNATIVES

The interim VI mitigation alternatives are intended to address RAO 2. The primary ARARs for the vapor intrusion alternatives are Indiana regulations establishing emissions limits for VOCs. A complete list of the ARARs considered is included in the FFS report. Since VI results from contaminated groundwater or soil, the only long-term remedy for the VI pathway is to treat or otherwise reduce concentrations of chemicals in groundwater or soil near residences and other buildings so that they no longer pose unacceptable VI risk. However, due to the time necessary to identify the source areas and remediate the source areas, the interim VI alternatives likely will be needed for many years. The following sections describe the three interim VI mitigation alternatives.

Alternative VI-1: No Action

Estimated Capital Cost: \$0

Estimated Total O&M: \$0

Estimated Present Worth Cost: \$0

Estimated Construction Timeframe: None

Under this alternative, no action would be taken to mitigate risk associated with soil vapor intrusion. Inclusion and evaluation of this alternative is required under the NCP.

Alternative VI-2: Sub-slab Depressurization (SSD) System

Estimated Capital Cost: \$460,000

Estimated Total Present-Worth O&M: \$360,000

Estimated Total Cost: \$ 800,000

Estimated Construction Timeframe: < 1 year

Under Alternative VI-2, active SSD systems would be installed at all residences and buildings in the Interim VI Remedial Area. SSD systems are similar to radon mitigation systems (See the first page of this proposed plan for a link to information regarding vapor intrusion and mitigation systems). Each SSD system would require operation and maintenance. An estimated 196 homes located within the Interim VI Remedial Area are expected to require mitigation. For commercial and industrial buildings, during the design phase, other technologies (such as building pressurization) would be allowed to be implemented. (Industrial and commercial buildings sometimes have heating, ventilation, and air conditioning systems which can be operated in a manner to control VI risk. Such operations may include increased air changes, or pressurizing the building relative to the soil gas pressure) ICs also would require that any new residential and commercial construction within the Interim VI Remedial Area be built with a VI mitigation system(s) until EPA determines that VI mitigation systems are no longer required. Ongoing maintenance of the systems and 5-year reviews would be required until monitoring results indicate that the mitigation systems are no longer required. This alternative is anticipated to remain in place until the sources are controlled and groundwater cleanup has been implemented such that vapor intrusion no longer presents an unacceptable risk.

Alternative VI-3: SSD System and Passive Barrier

Estimated Capital Cost: \$1,300,000

Estimated Total Present-Worth O&M: \$360,000

Estimated Total Cost: \$1,700,000

Estimated Construction Timeframe: < 1 Year

Alternative VI-3 includes all the components of Alternative VI-2 above and includes the application of a passive barrier (such as waterproof paint or a purpose-designed sealer) to basement floors and walls as a physical barrier to prevent vapors from entering buildings. The physical barrier should minimize VI even when the SSD system is not functioning (as in the case of a power outage). The application of a physical barrier in a retrofit situation is relatively new, and there is limited long-term experience with it. Where retrofitting has occurred, it has mostly been in industrial/commercial applications. For commercial and industrial buildings, during the design phase, other technologies (such as building pressurization) would be allowed to be implemented now. An estimated 196 buildings are expected to require mitigation. The alternative also includes ICs requiring that new buildings in the Interim VI Remedial Area be constructed with VI mitigation systems as long as monitoring results indicate the need for such systems. Ongoing maintenance of the systems and 5-year reviews would be required until monitoring results indicate that mitigation systems are no longer required.

C. EVALUATION OF ALTERNATIVES

Under the NCP, nine criteria are used to evaluate the different remediation alternatives individually and against each other in order to select a remedy. This section of the Proposed Plan profiles the relative performance of each alternative against the nine criteria, noting how it compares to the other remedial alternatives under consideration. The nine evaluation criteria are described below. A more detailed analysis of alternatives can be found in the Feasibility Study.

1. **Overall Protectiveness of Human Health and the Environment** determines whether an alternative eliminates, reduces, or controls threats to public health and the environment through institutional controls, engineering controls, or treatment.
2. **Compliance with ARARs** evaluates whether the alternative meets Federal and State environmental statutes, regulations and other requirements that pertain to the site, or whether a waiver is justified.
3. **Long-term Effectiveness and Permanence** considers the ability of an alternative to maintain protection of human health and the environment over time.
4. **Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment** evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present.
5. **Short-term Effectiveness** considers the length of time needed to implement an alternative and the risks the alternative poses to workers, residents, and the environment during implementation.
6. **Implementability** considers the technical and administrative feasibility of implementing the alternative, including factors such as the relative availability of goods and services. Technical feasibility considers the ability to construct and operate a technology and its reliability, the ease of undertaking additional remedial actions, and the ability to monitor the effectiveness of a remedy. Administrative feasibility considers the ability to obtain approvals from other parties or agencies and the extent of required coordination with other parties or agencies.
7. **Cost** includes estimated capital and annual operation and maintenance costs, as well as present worth cost. Present worth cost is the total cost of an alternative over time in terms of today's dollar value. Cost estimates are expected to be accurate within a range of +50 and -30 percent. In accordance with Superfund guidance, a discount rate of 7% was used to determine the present worth value.
8. **State/Support Agency Acceptance** considers whether the State agrees with EPA's analysis and recommendations, as described in the Proposed Plan.
9. **Community Acceptance** considers whether the local community agrees with EPA's analysis and preferred alternative. Comments received on the Proposed Plan are an important indicator of community acceptance.

D. COMPARISON OF ALTERNATIVES TO THE NINE CRITERIA

INTERIM GROUNDWATER MITIGATION ALTERNATIVES

This section provides a comparative analysis of the interim groundwater alternatives. Interim groundwater alternatives are intended to achieve RAO 1. Table 1 summarizes the comparative analysis. The interim alternatives can be successfully implemented before the source control (OU 2) remedy has been selected and implemented.

1. Overall Protection of Human Health and the Environment

Alternative GW-1 (no action) would provide no improvement over current conditions and no risk reduction, and would not be protective of human health or the environment. Because Alternative GW-1 does not pass this threshold criterion, it is not discussed further in the proposed plan. However, for comparison purposes, Alternative GW-1 is presented and scored within each category on Table 1.

Alternatives GW-2 and GW-3 each would be effective interim remedies and reduce risks associated with direct exposure to contaminated groundwater. Alternative GW-3 would be more protective overall than Alternative GW-2 because, under Alternative GW-2, children and adults could be exposed to contaminated groundwater if filters are not changed when required.

2. Compliance with Applicable or Relevant and Appropriate Requirements

Alternatives GW-2 and GW-3 would meet ARARs. The primary ARARs are the Safe Drinking Water Act and the Indiana Drinking Water Standards. A complete list of potential ARARs is included in the final FFS report.

3. Long-Term Effectiveness and Permanence

Alternative GW-3 would be more effective and permanent than Alternative GW-2 because Alternative GW-3 would not require ongoing O&M. Filtration systems need to be sampled and maintained on a regular basis to ensure the system is effective in removing contaminants throughout use. Under typical configurations for Alternative GW-2, water used for outdoor purposes would not be filtered, allowing potential exposure to contaminants. The public water supply in the City of Elkhart presently meets all drinking water criteria and is expected to reliably do so into the future.

4. Reduction of Toxicity, Mobility, or Volume through Treatment

Alternative GW-2 would provide some treatment of contaminated groundwater extracted by the residential wells and run through the filtration system. However, neither Alternative GW-2 nor Alternative GW-3 would significantly reduce the main volume of contamination in the groundwater plume(s). Both alternatives are intended to prevent or minimize current and future exposure to contaminated groundwater.

5. Short-Term Effectiveness

Alternative GW-2 can be implemented at impacted residences within a reasonable timeframe (less than one day per location after the equipment has been received and installation scheduled) and would impose minimal risks to workers and the public. Implementation of alternative GW-2 is estimated to take 40 working days; however, this could vary because installation will require scheduling access to work inside of all the residences requiring filters.

Alternative GW-3 also would have minimal short term impacts, although it would take longer to install than Alternative GW-2. The duration for installation of Alternative GW-3 is estimated at 160 working days, however this could vary depending on how many crews and how much equipment is used on the project. Risks to workers and the public would be slightly higher for Alternative GW-3 due to the heavy construction and trenching involved with the installation of water and service lines. Construction-related risks include the potential for vehicle accidents,

traffic and noise from construction vehicles, increased wear on local roads, and other risks associated with construction work. These impacts could be easily mitigated and managed by implementing a project-specific health and safety plan, keeping excavation areas properly braced, planning truck routes to minimize disturbances to the surrounding community, and other best management practices.

6. Implementability

Both Alternatives GW-2 and GW-3 are proven, readily technically implementable or easy to implement, and have been used successfully at other environmental cleanup projects. Qualified commercial contractors with experience are available locally to perform the work. In addition, both alternatives are administratively feasible. Although no permits would be required because the work would be performed under CERCLA, a similar level of coordination would be needed with state and local parties during design and construction activities for each alternative.

Alternative GW-2 would include the administrative challenge associated with securing needed access to properties for the required long-term O&M of the filters, and the associated cooperation of properties owners in maintaining the filters. Alternative GW-3 would include the administrative challenge associated with owner cooperation for the abandonment of the private drinking water wells.

7. Cost

The estimated present value cost for Alternative 2 is \$1.7 M and \$2.0 million for Alternative GW-3.

8. State/Support Agency Acceptance

The State of Indiana supports Alternative GW-3, the preferred alternative.

9. Community Acceptance

Community acceptance of the preferred alternative will be evaluated after the public comment period ends and will be described in the Record of Decision (ROD).

INTERIM VAPOR INTRUSION MITIGATION ALTERNATIVES

This section provides a comparative analysis of the interim VI mitigation alternatives. Interim VI mitigation alternatives are intended to achieve RAO 2. Table 2 summarizes the comparative analysis. The interim alternatives can be successfully implemented before the source control (OU 2) remedy has been selected and implemented.

1. Overall Protection of Human Health and the Environment

Alternative VI-1 (no action) would provide no improvement over current conditions and no risk reduction, and therefore would not be protective of human health or the environment. Because Alternative VI-1 does not meet this threshold criterion, it is not further discussed in the proposed plan. However, for comparison purposes, this alternative is included in the Table 2.

Alternatives VI-2 and VI-3 each would be effective remedies and reduce risks associated with VI. Alternative VI-3 would be slightly more protective overall than Alternative VI-2 because, in addition to the SSD system, a passive barrier would be added to further block VI.

2. Compliance with Applicable or Relevant and Appropriate Requirements

Alternatives VI-2 and VI-3 would meet ARARs. The primary ARARs for the vapor intrusion alternatives are Indiana regulations establishing emissions limits for VOCs. Both alternatives VI-2 and VI-3 are expected to emit VOCs which are significantly below the threshold requiring a permit from the State of Indiana. A complete list of potential ARARs is included in the final FFS report.

3. Long-Term Effectiveness and Permanence

Alternative VI-2 would be effective in the long term. Alternative VI-3 would be more effective than Alternative VI-2 as a result of the addition of the barrier, which would provide a higher degree of permanence. Alternative VI-3 would require more extensive O&M when compared to Alternative VI-2.

4. Reduction of Toxicity, Mobility, or Volume through Treatment

Neither Alternative VI-2 nor Alternative VI-3 would use treatment to reduce the toxicity, mobility or volume of the contamination in the groundwater plume(s). Both alternatives would reduce exposure to contaminants by reducing the mobility of vapors toward receptors within buildings.

5. Short-Term Effectiveness

The SSD systems under Alternatives VI-2 and VI-3 typically could be installed in most residences and properties in less than 1 day at most residences, and therefore would have only a slight impact. Alternative VI-3 may provide some additional VOC exposure within allowable limits while the barrier is drying. Risks to workers and the public would be minimal.

Additionally, basements would have to be cleared of stored materials to allow access to apply the barrier material. Risks to workers and the public would be minimal, although there may be some short-term odors from the application of the barrier material, some of which are essentially specialty paints.

6. Implementability

Administratively, Alternatives VI-2 and VI-3 are proven, readily implementable, and have been used successfully at other environmental cleanup projects. Qualified contractors with experience are available locally to perform the work. Some barrier products are proprietary and may require application by a manufacturer-approved contractor.

Both alternatives would be administratively feasible. Although no permits would be required because the work would be performed under CERCLA, a similar level of coordination would be needed with state and local parties during design and construction activities for each active alternative. The most significant administrative challenge would likely be getting cooperation and access from residents, whose SSD systems would require long-term O&M commitments. VI-3 provides a physical barrier that would provide protection even if O&M proved difficult to implement. However, the physical barrier also requires O&M to assure effectiveness, and the installation and upkeep of the barriers would be more intrusive, requiring the basements to be cleared for inspection and upkeep.

7. Cost

The estimated present value cost for Alternative VI-2 is \$800 K; and \$1.7 million for Alternative VI-3.

8. State/Support Agency Acceptance

The State of Indiana supports Alternative VI-2, which is the preferred alternative.

9. Community Acceptance

Community acceptance of the preferred alternative will be evaluated after the public comment period ends and will be described in the Record of Decision (ROD) for the site.

E. PREFERRED ALTERNATIVE

The preferred interim alternative for cleaning up the Site is Alternative GW-3 for groundwater contamination and Alternative VI-2 for the vapor intrusion mitigation. Based on the information available at this time, EPA and the State of Indiana believe that the Preferred Alternatives would be protective of human health and the environment, cost effective, highly effective in the short term, technically/administratively implementable, and would comply with ARARs. The Preferred Alternative can change in response to public comment or new information. Alternative GW-3 would have high long-term effectiveness and permanence. It would provide a safe municipal water supply to all areas of the Site. Very limited O&M would be required, and after initial implementation, further coordination with residents would not be required. Alternative VI-2 would be effective in the long term, although its effectiveness depends on the cooperation and participation of residents in operating and maintaining the individual SSD systems. It is preferred over VI-3, because the relatively minimal additional protectiveness added by that alternative is outweighed by its greater intrusiveness on the residents and its significantly higher cost. Additionally, the long term permanence of the barrier has not been demonstrated at other sites for vapor intrusion. The preferred interim alternatives would reduce exposure to COCs but would not treat the source materials constituting principal threats; therefore, would not satisfy the statutory preference for treatment. After the selection and implementation of the preferred interim alternatives presented in this proposed plan, which will address the potential current and future exposures, a separate RI/FS will be conducted to address the Site source areas and the overall groundwater plume as OU 2.

IX. COMMUNITY INVOLVEMENT

EPA and IDEM provide information regarding the clean-up of the Site to the public through public meetings, the Administrative Record file for the Site, the Site Information Repositories maintained at the Elkhart Public library and the EPA Record Center, and announcements published in the *Elkhart Truth*. EPA and the State encourage the public to gain a more comprehensive understanding of the Site and the Superfund activities that have been conducted at the Site.

The dates for the public comment period, the date, location, and time of the public meeting, and the locations of the Administrative Record files, are provided on the front page of this Proposed Plan.

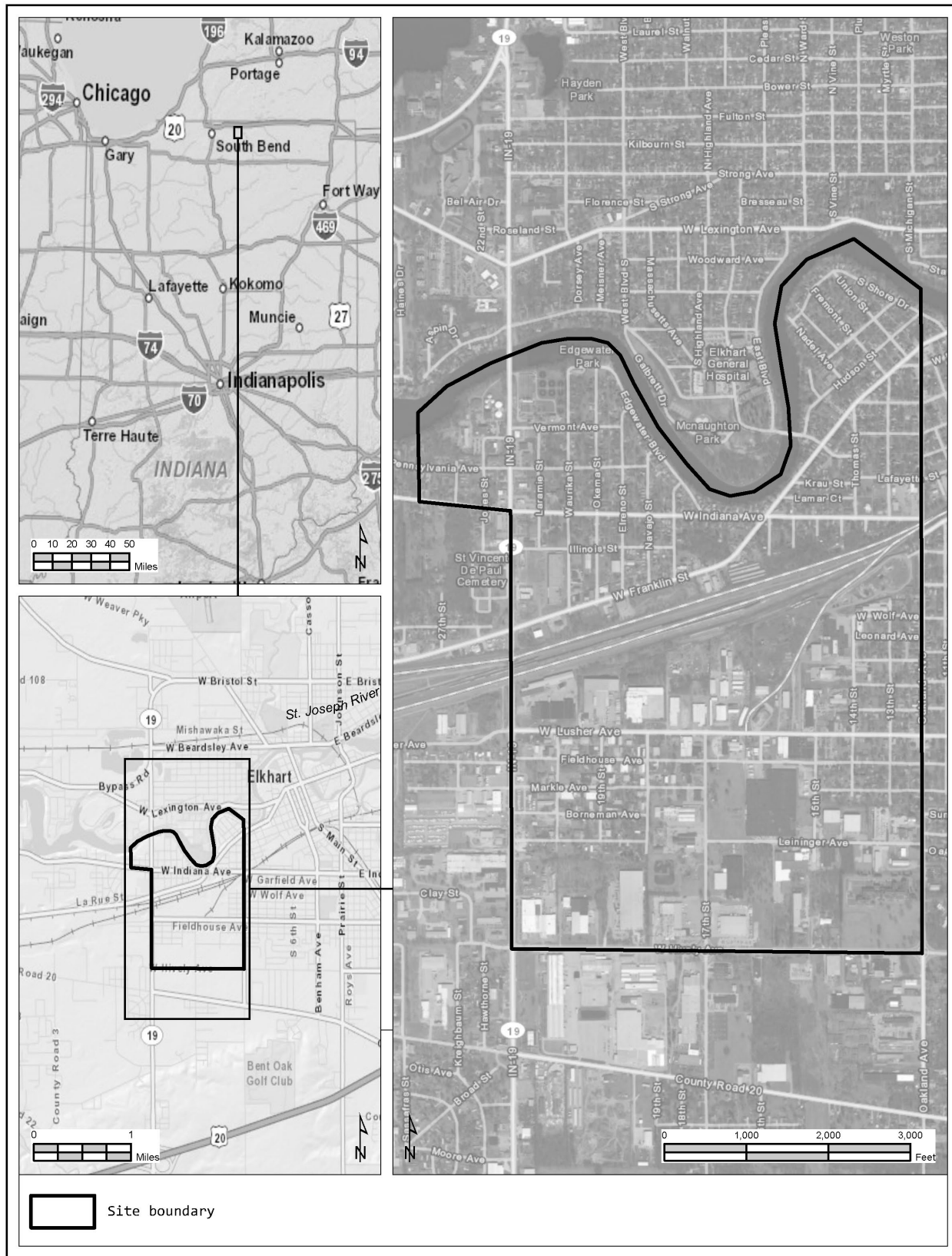


Figure 2: Site Location Map

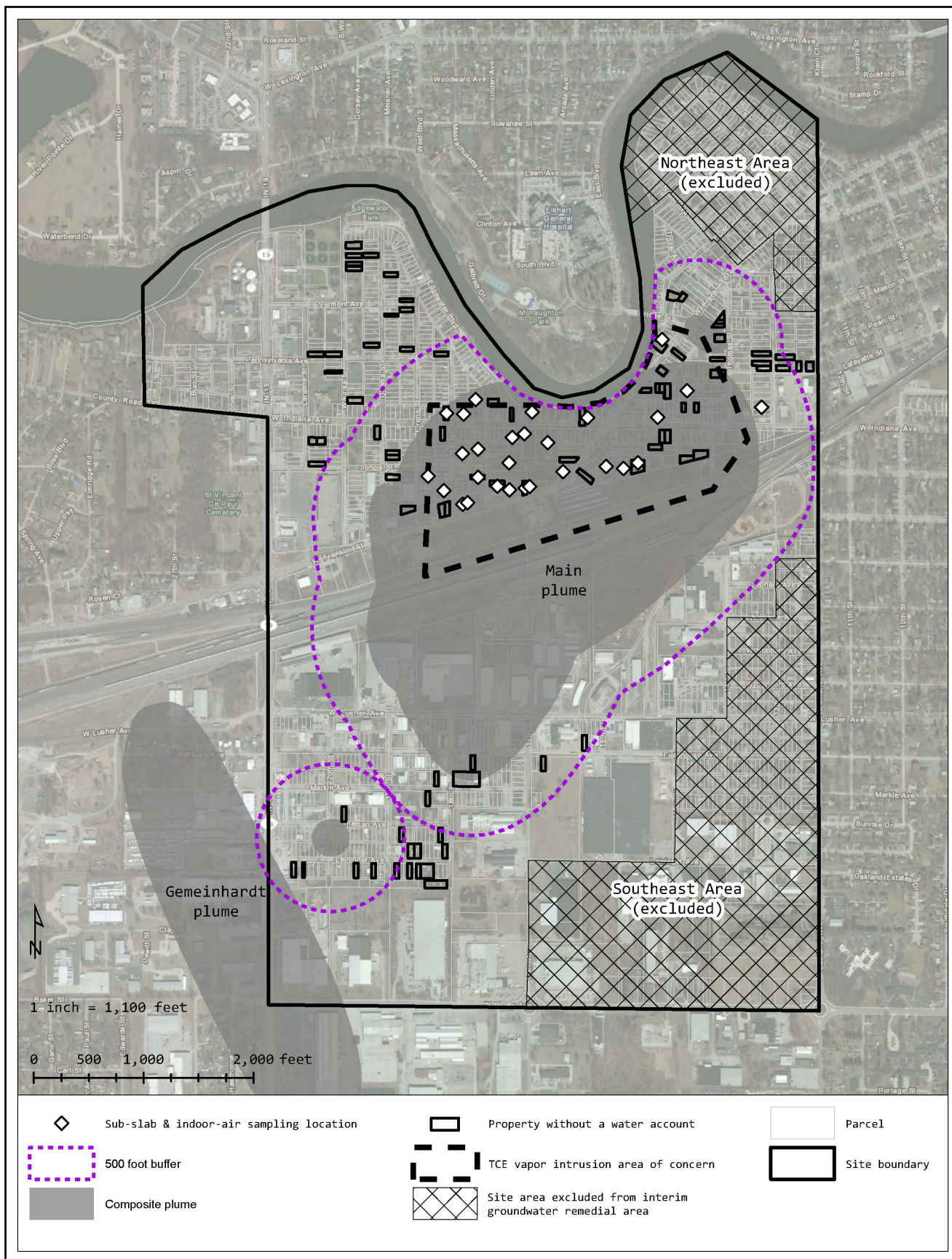


Figure 3 – Groundwater Plume and Proposed Cleanup Areas

Table 1: Chart Comparing Groundwater Risk Mitigation Options with the Nine Superfund Remedy Selection Criteria

Evaluation Criterion	Alternative GW-1	Alternative GW-2	Alternative GW-3*
1. Overall Protection of Human Health and the Environment	○	●	●
2. Compliance with ARARs	○	●	●
3. Long-term Effectiveness and Permanence	○	⊙	●
4. Reduction of Toxicity, Mobility, or Volume through Treatment	○	○	○
5. Short-term Effectiveness	○	●	●
6. Implementability	●	●	●
7. Cost (\$ millions)	\$0	\$1.7	\$2.0
8. State Acceptance	The State supports the preferred alternative (Alternative 3).		
9. Community Acceptance	Will be evaluated after the public comment period.		

● Fully meets criterion ⊙ Partially meets criterion ○ Does not meet criterion
 * EPA's preferred alternative

Table 2: Chart Comparing Interim Vapor Intrusion Risk Mitigation Options with the Nine Superfund Remedy Selection Criteria

Evaluation Criterion	Alternative VI-1	Alternative VI-2*	Alternative VI-3
1. Overall Protection of Human Health and the Environment	○	●	●
2. Compliance with ARARs	○	●	●
3. Long-term Effectiveness and Permanence	○	●	●
4. Reduction of Toxicity, Mobility, or Volume through Treatment	○	○	○
5. Short-term Effectiveness	○	●	●
6. Implementability	●	●	●
7. Cost (\$ millions)	\$0	\$0.8	\$1.7
8. State Acceptance	The State supports the preferred alternative.		
9. Community Acceptance	Will be evaluated after the public comment period.		

● Fully meets criterion ◎ Partially meets criterion ○ Does not meet criterion
 * EPA's preferred alternative